CDC A-Z INDEX Y

Q

Public Health Genomics and Precision Health Knowledge Base (v7.3)

PHGKB About **MyPHGKB** Specialized PHGKB Genomics (A-Z) Office of Genomics and **Precision Public Health** My Family Health Portrait **State Public Health Genomics** Programs Map **Genomics Precision Health** Weekly Scan (Current Edition) Advanced Molecular **Detection Weekly Clips** (Current Edition) Non-Genomics Precision Health Weekly Scan (Current Edition) **CDC-authored Publications** Update **COVID-19 Precision Health** Weekly Update (Current Edition)

All Databases

Release Note

Contact Us

DataSet Download Center

Archived Editions (COVID-19 Genomics and Precision Public Health Weekly Update)

Tweet Share Recommend

Published on 04/08/2021

COVID-19 Genomics and Precision Public Health Weekly Update Content

- Pathogen and Human Genomics Studies Non-Genomics Precision Health Studies

News, Reviews and Commentaries

Pathogen and Human Genomics Studies

• Antibody responses to the BNT162b2 mRNA vaccine in individuals previously infected with SARS-CoV-2 JE Ebinger et al, Nature Medicine, April 1, 2021

similar to those seen after two doses of vaccine in individuals without prior infection (n?=?228). COVID-19 in individuals with sickle cell disease/trait compared with other Black individuals. Singh Ashima et al. Blood advances 2021 4 (7) 1915-1921

In a cohort of BNT162b2 (Pfizer-BioNTech) mRNA vaccine recipients (n?=?1,090), we observed that spike-specific IgG antibody levels and

ACE2 antibody binding inhibition responses elicited by a single vaccine dose in individuals with prior SARS-CoV-2 infection (n?=?35) were

After 1:1 propensity score matching (based on age, sex, and other preexisting comorbidities), patients with COVID-19 and SCD remained at a

higher risk of hospitalization (relative risk [RR], 2.0; 95% CI, 1.5-2.7) and development of pneumonia (RR, 2.4; 95% CI, 1.6-3.4) and pain (RR, 3.4;

95% CI, 2.5-4.8) compared with Black persons without SCD/SCT • B.1.526 SARS-CoV-2 variants identified in New York City are neutralized by vaccine-elicited and therapeutic monoclonal antibodies.

Zhou Hao et al. bioRxiv: the preprint server for biology 2021 4

We report that convalescent sera and vaccine-elicited antibodies retain full neutralizing titer against the S477N B.1.526 variant and neutralize the E484K version with a modest 3.5-fold decrease in titer as compared to D614G. The E484K version was neutralized with a 12-fold decrease

in titer by the REGN10933 monoclonal antibody but the combination cocktail with REGN10987 was fully active.

SARS-CoV-2 variants B.1.351 and P.1 escape from neutralizing antibodies. Hoffmann Markus et al. Cell 2021 4

COVIDOUTCOME – Estimating COVID Severity Based on Mutation Signatures in the SARS-CoV-2 Genome

19 patients and sera from BNT162b2-vaccinated individuals

Reactogenicity Following Receipt of mRNA-Based COVID-19 Vaccines

SA Buchan et al, MEDRXIV, April 5, 2021

lineages that seeded the local epidemic.

A Nagy et al, BIORXIV, April 2, 2021 Numerous studies demonstrate frequent mutations in the genome of SARS-CoV-2. Our goal was to statistically link mutations to severe disease outcome. We used an automated machine learning approach where 1,594 viral genomes with available clinical follow-up data were used as the training set (797 - severe and 797 - mild). We identified 26 protein and UTR mutations significantly linked to severe outcome. The

Using pseudoparticles, we show that entry of all variants into human cells is susceptible to blockade by the entry inhibitors soluble ACE2,

Camostat, EK-1, and EK-1-C4. In contrast, entry of the B.1.351 and P.1 variant was partially (Casirivimab) or fully (Bamlanivimab) resistant to

antibodies used for COVID-19 treatment. Moreover, entry of these variants was less efficiently inhibited by plasma from convalescent COVID-

best algorithm uses a mutation signature of 22 mutations and patient age.

J Chapin-Bardales et al, JAMA, April 5, 2021 The frequency of reported reactions was generally consistent with results observed in clinical trials. Data from millions of v-safe participants indicate that injection site pain is common after both the first and second doses of either mRNA-based vaccine. Systemic reactions, including fatigue, headache, myalgia, chills, fever, and joint pain, occurred in participants after the first dose, although they were more frequently reported after the second dose among. Persons 65 years and older reported less reactogenicity than younger persons.

• Increased household secondary attacks rates with Variant of Concern SARS-CoV-2 index cases

increased transmissibility in households due to VOCs and suggests that asymptomatic and pre-symptomatic transmission may be of particular importance for VOCs. Multiple Early Introductions of SARS-CoV-2 to Cape Town, South Africa. Engelbrecht Susan et al. Viruses 2021 4 (3)

Cape Town was the first city in South Africa to experience the full impact of the coronavirus disease 2019 (COVID-19) pandemic. We acquired

samples from all suspected cases and their contacts during the first month of the pandemic from Tygerberg Hospital. Nanopore sequencing

generated SARS-CoV-2 whole genomes. Phylogenetic inference with maximum likelihood and Bayesian methods were used to determine

this matched cohort was 1.31 times higher than non-VOC index cases (RR=1.31, 95%CI 1.14-1.49). The study provides strong evidence of

We included 1,259 index VOC and non-VOC cases in the propensity score-matched analysis. The secondary attack rate for VOC index cases in

• Cross-Reactive Neutralizing Antibody Responses Elicited by SARS-CoV-2 501Y.V2 (B.1.351).

Moyo-Gwete Thandeka et al. The New England journal of medicine 2021 4

We found that 501Y.V2 elicits robust neutralizing antibody responses against both the original variant and 501Y.V3 (P.1), which indicates high levels of cross-reactivity. Our data indicate that vaccines built on the spike protein of 501Y.V2 may be promising candidates for the elicitation of cross-reactive neutralizing antibody responses to SARS-CoV-2. Neutralization of SARS-CoV-2 Variants B.1.429 and B.1.351. Shen Xiaoying et al. The New England journal of medicine 2021 4

Our results, and the high efficacy shown by these vaccines, suggest that vaccine-elicited neutralizing antibodies are likely to remain effective

against the B.1.429 variant. The magnitude of resistance seen with the B.1.351 variant is of greater concern with respect to current vaccines.

We found that a single dose of mRNA vaccine elicited rapid immune responses in seropositive participants, with postvaccination antibody titers that were similar to or exceeded titers found in seronegative participants who received two vaccinations. Whether a single dose of mRNA

Krammer Florian et al. The New England journal of medicine 2021 3 (14) 1372-1374

vaccine provides effective protection in seropositive persons requires investigation.

Antibody Responses in Seropositive Persons after a Single Dose of SARS-CoV-2 mRNA Vaccine.

Non-Genomics Precision Health Studies Antibody responses to the BNT162b2 mRNA vaccine in individuals previously infected with SARS-CoV-2 JE Ebinger et al, Nature Medicine, April 1, 2021

In a cohort of BNT162b2 (Pfizer-BioNTech) mRNA vaccine recipients (n?=?1,090), we observed that spike-specific IgG antibody levels and

ACE2 antibody binding inhibition responses elicited by a single vaccine dose in individuals with prior SARS-CoV-2 infection (n?=?35) were

COVID-19 in individuals with sickle cell disease/trait compared with other Black individuals.

Hoffmann Markus et al. Cell 2021 4

Zhou Hao et al. bioRxiv: the preprint server for biology 2021 4

Singh Ashima et al. Blood advances 2021 4 (7) 1915-1921

similar to those seen after two doses of vaccine in individuals without prior infection (n?=?228).

higher risk of hospitalization (relative risk [RR], 2.0; 95% CI, 1.5-2.7) and development of pneumonia (RR, 2.4; 95% CI, 1.6-3.4) and pain (RR, 3.4; 95% CI, 2.5-4.8) compared with Black persons without SCD/SCT • B.1.526 SARS-CoV-2 variants identified in New York City are neutralized by vaccine-elicited and therapeutic monoclonal antibodies.

We report that convalescent sera and vaccine-elicited antibodies retain full neutralizing titer against the S477N B.1.526 variant and neutralize

the E484K version with a modest 3.5-fold decrease in titer as compared to D614G. The E484K version was neutralized with a 12-fold decrease

After 1:1 propensity score matching (based on age, sex, and other preexisting comorbidities), patients with COVID-19 and SCD remained at a

in titer by the REGN10933 monoclonal antibody but the combination cocktail with REGN10987 was fully active. SARS-CoV-2 variants B.1.351 and P.1 escape from neutralizing antibodies.

Using pseudoparticles, we show that entry of all variants into human cells is susceptible to blockade by the entry inhibitors soluble ACE2, Camostat, EK-1, and EK-1-C4. In contrast, entry of the B.1.351 and P.1 variant was partially (Casirivimab) or fully (Bamlanivimab) resistant to

19 patients and sera from BNT162b2-vaccinated individuals COVIDOUTCOME - Estimating COVID Severity Based on Mutation Signatures in the SARS-CoV-2 Genome A Nagy et al, BIORXIV, April 2, 2021

Numerous studies demonstrate frequent mutations in the genome of SARS-CoV-2. Our goal was to statistically link mutations to severe

disease outcome. We used an automated machine learning approach where 1,594 viral genomes with available clinical follow-up data were

used as the training set (797 - severe and 797 - mild). We identified 26 protein and UTR mutations significantly linked to severe outcome. The

antibodies used for COVID-19 treatment. Moreover, entry of these variants was less efficiently inhibited by plasma from convalescent COVID-

best algorithm uses a mutation signature of 22 mutations and patient age. Reactogenicity Following Receipt of mRNA-Based COVID-19 Vaccines J Chapin-Bardales et al, JAMA, April 5, 2021 The frequency of reported reactions was generally consistent with results observed in clinical trials. Data from millions of v-safe participants

indicate that injection site pain is common after both the first and second doses of either mRNA-based vaccine. Systemic reactions, including

fatigue, headache, myalgia, chills, fever, and joint pain, occurred in participants after the first dose, although they were more frequently

reported after the second dose among. Persons 65 years and older reported less reactogenicity than younger persons.

SA Buchan et al, MEDRXIV, April 5, 2021 We included 1,259 index VOC and non-VOC cases in the propensity score-matched analysis. The secondary attack rate for VOC index cases in this matched cohort was 1.31 times higher than non-VOC index cases (RR=1.31, 95%CI 1.14-1.49). The study provides strong evidence of

Increased household secondary attacks rates with Variant of Concern SARS-CoV-2 index cases

importance for VOCs. Multiple Early Introductions of SARS-CoV-2 to Cape Town, South Africa. Engelbrecht Susan et al. Viruses 2021 4 (3) Cape Town was the first city in South Africa to experience the full impact of the coronavirus disease 2019 (COVID-19) pandemic. We acquired samples from all suspected cases and their contacts during the first month of the pandemic from Tygerberg Hospital. Nanopore sequencing

generated SARS-CoV-2 whole genomes. Phylogenetic inference with maximum likelihood and Bayesian methods were used to determine

increased transmissibility in households due to VOCs and suggests that asymptomatic and pre-symptomatic transmission may be of particular

Moyo-Gwete Thandeka et al. The New England journal of medicine 2021 4 We found that 501Y.V2 elicits robust neutralizing antibody responses against both the original variant and 501Y.V3 (P.1), which indicates high levels of cross-reactivity. Our data indicate that vaccines built on the spike protein of 501Y.V2 may be promising candidates for the elicitation

of cross-reactive neutralizing antibody responses to SARS-CoV-2.

Cross-Reactive Neutralizing Antibody Responses Elicited by SARS-CoV-2 501Y.V2 (B.1.351).

lineages that seeded the local epidemic.

JE Ebinger et al, Nature Medicine, April 1, 2021

 Neutralization of SARS-CoV-2 Variants B.1.429 and B.1.351. Shen Xiaoying et al. The New England journal of medicine 2021 4 Our results, and the high efficacy shown by these vaccines, suggest that vaccine-elicited neutralizing antibodies are likely to remain effective against the B.1.429 variant. The magnitude of resistance seen with the B.1.351 variant is of greater concern with respect to current vaccines.

We found that a single dose of mRNA vaccine elicited rapid immune responses in seropositive participants, with postvaccination antibody

titers that were similar to or exceeded titers found in seronegative participants who received two vaccinations. Whether a single dose of mRNA

News, Reviews and Commentaries

Antibody responses to the BNT162b2 mRNA vaccine in individuals previously infected with SARS-CoV-2

similar to those seen after two doses of vaccine in individuals without prior infection (n?=?228).

Antibody Responses in Seropositive Persons after a Single Dose of SARS-CoV-2 mRNA Vaccine.

Krammer Florian et al. The New England journal of medicine 2021 3 (14) 1372-1374

vaccine provides effective protection in seropositive persons requires investigation.

 COVID-19 in individuals with sickle cell disease/trait compared with other Black individuals. Singh Ashima et al. Blood advances 2021 4 (7) 1915-1921

After 1:1 propensity score matching (based on age, sex, and other preexisting comorbidities), patients with COVID-19 and SCD remained at a

B.1.526 SARS-CoV-2 variants identified in New York City are neutralized by vaccine-elicited and therapeutic monoclonal antibodies.

in titer by the REGN10933 monoclonal antibody but the combination cocktail with REGN10987 was fully active.

higher risk of hospitalization (relative risk [RR], 2.0; 95% CI, 1.5-2.7) and development of pneumonia (RR, 2.4; 95% CI, 1.6-3.4) and pain (RR, 3.4;

We report that convalescent sera and vaccine-elicited antibodies retain full neutralizing titer against the S477N B.1.526 variant and neutralize

the E484K version with a modest 3.5-fold decrease in titer as compared to D614G. The E484K version was neutralized with a 12-fold decrease

In a cohort of BNT162b2 (Pfizer-BioNTech) mRNA vaccine recipients (n?=?1,090), we observed that spike-specific IgG antibody levels and

ACE2 antibody binding inhibition responses elicited by a single vaccine dose in individuals with prior SARS-CoV-2 infection (n?=?35) were

• SARS-CoV-2 variants B.1.351 and P.1 escape from neutralizing antibodies. Hoffmann Markus et al. Cell 2021 4 Using pseudoparticles, we show that entry of all variants into human cells is susceptible to blockade by the entry inhibitors soluble ACE2,

95% CI, 2.5-4.8) compared with Black persons without SCD/SCT

Zhou Hao et al. bioRxiv: the preprint server for biology 2021 4

antibodies used for COVID-19 treatment. Moreover, entry of these variants was less efficiently inhibited by plasma from convalescent COVID-19 patients and sera from BNT162b2-vaccinated individuals COVIDOUTCOME – Estimating COVID Severity Based on Mutation Signatures in the SARS-CoV-2 Genome A Nagy et al, BIORXIV, April 2, 2021

Numerous studies demonstrate frequent mutations in the genome of SARS-CoV-2. Our goal was to statistically link mutations to severe

disease outcome. We used an automated machine learning approach where 1,594 viral genomes with available clinical follow-up data were

used as the training set (797 - severe and 797 - mild). We identified 26 protein and UTR mutations significantly linked to severe outcome. The

indicate that injection site pain is common after both the first and second doses of either mRNA-based vaccine. Systemic reactions, including

fatigue, headache, myalgia, chills, fever, and joint pain, occurred in participants after the first dose, although they were more frequently

reported after the second dose among. Persons 65 years and older reported less reactogenicity than younger persons.

Camostat, EK-1, and EK-1-C4. In contrast, entry of the B.1.351 and P.1 variant was partially (Casirivimab) or fully (Bamlanivimab) resistant to

 Reactogenicity Following Receipt of mRNA-Based COVID-19 Vaccines J Chapin-Bardales et al, JAMA, April 5, 2021 The frequency of reported reactions was generally consistent with results observed in clinical trials. Data from millions of v-safe participants

best algorithm uses a mutation signature of 22 mutations and patient age.

importance for VOCs.

Engelbrecht Susan et al. Viruses 2021 4 (3)

Increased household secondary attacks rates with Variant of Concern SARS-CoV-2 index cases SA Buchan et al, MEDRXIV, April 5, 2021 We included 1,259 index VOC and non-VOC cases in the propensity score-matched analysis. The secondary attack rate for VOC index cases in this matched cohort was 1.31 times higher than non-VOC index cases (RR=1.31, 95%CI 1.14-1.49). The study provides strong evidence of increased transmissibility in households due to VOCs and suggests that asymptomatic and pre-symptomatic transmission may be of particular

Cape Town was the first city in South Africa to experience the full impact of the coronavirus disease 2019 (COVID-19) pandemic. We acquired

samples from all suspected cases and their contacts during the first month of the pandemic from Tygerberg Hospital. Nanopore sequencing

generated SARS-CoV-2 whole genomes. Phylogenetic inference with maximum likelihood and Bayesian methods were used to determine lineages that seeded the local epidemic. Cross-Reactive Neutralizing Antibody Responses Elicited by SARS-CoV-2 501Y.V2 (B.1.351).

Multiple Early Introductions of SARS-CoV-2 to Cape Town, South Africa.

Moyo-Gwete Thandeka et al. The New England journal of medicine 2021 4

levels of cross-reactivity. Our data indicate that vaccines built on the spike protein of 501Y.V2 may be promising candidates for the elicitation of cross-reactive neutralizing antibody responses to SARS-CoV-2. Neutralization of SARS-CoV-2 Variants B.1.429 and B.1.351. Shen Xiaoying et al. The New England journal of medicine 2021 4

Our results, and the high efficacy shown by these vaccines, suggest that vaccine-elicited neutralizing antibodies are likely to remain effective

against the B.1.429 variant. The magnitude of resistance seen with the B.1.351 variant is of greater concern with respect to current vaccines.

We found that 501Y.V2 elicits robust neutralizing antibody responses against both the original variant and 501Y.V3 (P.1), which indicates high

 Antibody Responses in Seropositive Persons after a Single Dose of SARS-CoV-2 mRNA Vaccine. Krammer Florian et al. The New England journal of medicine 2021 3 (14) 1372-1374 We found that a single dose of mRNA vaccine elicited rapid immune responses in seropositive participants, with postvaccination antibody

You

titers that were similar to or exceeded titers found in seronegative participants who received two vaccinations. Whether a single dose of mRNA vaccine provides effective protection in seropositive persons requires investigation.

Disclaimer: Articles listed in COVID-19 Genomics and Precision Public Health Weekly Update are selected by the CDC Office of Public Health Genomics

to provide current awareness of the scientific literature and news. Inclusion in the update does not necessarily represent the views of the Centers for

Disease Control and Prevention nor does it imply endorsement of the article's methods or findings. CDC and DHHS assume no responsibility for the

factual accuracy of the items presented. The selection, omission, or content of items does not imply any endorsement or other position taken by CDC or DHHS. Opinion, findings and conclusions expressed by the original authors of items included in the Clips, or persons quoted therein, are strictly their own and are in no way meant to represent the opinion or views of CDC or DHHS. References to publications, news sources, and non-CDC Websites are provided solely for informational purposes and do not imply endorsement by CDC or DHHS.

Page last reviewed: Oct 1, 2020

Page last updated: Apr 16, 2021

** Follow CDC **CDC Media About CDC** Legal **Contact CDC Employment**

Content source: Office of Genomics and Precision Public Health, CDC Office of Science

Newsroom Training/Education Funding CDC's Organization Mission and Vision Using this Site

All Languages

Link to Us **Policies FOIA** Accessibility Privacy

No FEAR Act

Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333 USA 800-CDC-INFO (800-232-4636) Contact CDC-INFO